ABSTRACT

Chlorous acid is generated from a chlorite salt precursor, a chlorate salt precursor, or a combination of both by ion exchange. The ion exchange material facilitates the generation of chlorous acid by simultaneously removing unwanted cations from solution and adding hydrogen ion to solution. Chlorine dioxide is generated in a controlled manner from chlorous acid by catalysis. Chlorine dioxide can be generated either subsequent to the generation of chlorous acid or simultaneously with the generation of chlorous acid. For catalysis of chlorous acid to chlorine dioxide, the chlorous acid may be generated by ion exchange or in a conventional manner. Ion exchange materials are also used to purify the chlorous acid and chlorine dioxide solutions, without causing degradation of said solutions, to exchange undesirable ions in the chlorous acid and chlorine dioxide solutions with desirable ions, such as stabilizing ions, and to adjust the pH of chlorous acid and chlorine dioxide solutions.